

SOV/137-58-11-23428

Translation from: Referativnyy zhurnal. Metallurgiya, 1958, Nr 11, p 227 (USSR)

AUTHOR: . Shermergor, T.D.

TITLE: On the Theory of Relaxation Phenomena in Solids (K teorii relaksatsionnykh yavleniy v tverdykh telakh).

PERIODICAL: Dokl. 7-y Nauchn. konferentsii, posvyashch. 40-letiyu Velikoy Oktyabr'sk. sots. revolyutsii. Nr 2. Tomsk, Tomskiy un-t, 1957, pp 68-69

ABSTRACT: *The author develops a theory of the relaxation phenomena in solids. In considering a nonhomogeneous, isotropic, unbounded elastic body, the author utilizes a method of the thermodynamics of unbalanced conditions proposed by Leontovich and developed by Finkel'shteyn and Fastov in application to stress relaxation. The computations provide formulae for the elastic moduli, the latter being determined from the combination of all periods of relaxation. The connection existing between the formulae obtained and a generalized form of Hooke's law is discussed.*

V. N.

Card 1/1

SHERMERGOR, T.D.

Thermodynamic theory of elastic aftereffect. Izv. vys. ucheb.zav.;
Fiz. no.1:78-85 '58. (MIRA 11:6)

1.Sibirskiy metallurgicheskiy institut imeni S. Ordzhonikidze.
(Elasticity)

SHERMERGOR, T.D., kand.fiz.-mat nauk

Effect of relaxation processes on the curve of plastic flow
of metals. Izv. vys. ucheb. zav.; chern. met. no.3:111-118 Mr
'58. (MIRA 11:5)

1. Sibirskiy metallurgicheskiy institut.
(Deformations (Mechanics))
(Metals, Effect of temperature on)

2;(8)

AUTHOR:

Shermergor, T.D.

SOV/155-58-5-25/37

TITLE:

On the Thermodynamic Description of Processes Being not in the State of Equilibrium

PERIODICAL:

Nauchnyye doklady vysshey shkoly. Fiziko-matematicheskiye nauki, 1958, Nr 5, pp 147 - 150 (USSR)

ABSTRACT:

The author shows that the usual relaxation relations

$$A = \bar{A} + \langle \phi, \dot{a} \rangle,$$

where \bar{A} is the value of the column matrix A corresponding to the equilibrium, \dot{a} a known function of time, $\phi = \exp(-St)F$, F a rectangular $(n+m-k) \times k$ - matrix, S a quadratic $(n+m-k) \times (n+m-k)$ - matrix and

$$\langle \phi, \dot{a} \rangle \equiv \int_0^t \phi(t-\tau) \dot{a}(\tau) d\tau$$

can be derived from the equation

$$J_i = L_{ik} X_k$$

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On the Thermodynamic Description of Processes
Being not in the State of Equilibrium

SOV/155-58-5-25/37

for stationary processes, where X_i are forces, J_i the currents
and $||L_{ik}||$ is a symmetric matrix according to Onsager. Some
examples are given.

There are 7 references, 6 of which are Soviet, and
1 American.

ASSOCIATION: Sibirskiy metallurgicheskiy institut (Siberian Metallurgical
Institute)

SUBMITTED: July 21, 1958 ✓

Card 2/2

AUTHOR: Shermergor, T. D.

SOV/126-6-6-16/25

TITLE: On the Theory of Relaxational Phenomena in Solid Bodies (K
teorii relaksatsionnykh yavleniy v tverdykh telakh)

PERIODICAL: Fizika metallov i metallovedeniye, 1958, Vol 6, Nr 6,
pp 1077-1080 (USSR)

ABSTRACT: Theoretical investigations of relaxation of stresses and deformations in solids are usually generalizations of Hooke's law or they use the Boltzmann theory of elastic after-effects or thermodynamics of non-equilibrium processes. The thermodynamic method is the most general. It was applied by the author to calculate stress tensor for a non-uniform isotropic unbounded solid. The author shows that, in general, the dynamic values of elastic moduli are determined by a spectrum of relaxation times. The paper is entirely theoretical. There are 8 Soviet references.

ASSOCIATION: Sibirskiy metallurgicheskiy institut im. S. Ordzhonikidze
(Siberian Metallurgical Institute im. S. Ordzhonikidze)

SUBMITTED: February 4, 1947 and after revision, April 10, 1957.

Card 1/1

AUTHOR: Shermergor, T. D.

57-28-3-28/33

TITLE: On the Thermodynamic Theory of Relaxation Processes (K termo= dinamicheskoy teorii relaksatsionnykh protsessov)

PERIODICAL: Zhurnal Tekhnicheskoy Fiziki, 1958, Vol. 28, Nr 3, pp. 647-654 (USSR)

ABSTRACT: A relation between the strain and deformation of a heterogeneous isotropic elastic body is found here. The investigation is performed according to reference 3 by Finkel'shteyn and Fastov, only the temperature is considered variable. The heterogeneous body is subdivided into so many N-domains that within each domain the medium may be considered homogeneous. For marking the instantaneous deviation of the system-state from the equilibrium position the relaxation tensor $\xi_{ik\nu}$ for each domain is introduced. The

equilibrium value of the relaxation tensor should be $\bar{\xi}_{ik\nu}$. Then

Card 1/2 $\xi_{ik\nu} - \bar{\xi}_{ik\nu} = \zeta_{ik\nu}$

On the Thermodynamic Theory of Relaxation Processes

57-28-3-28/33

has a simple physical meaning: it is the additional deformation which must instantaneously be given to the investigated body-element, in order to put it into the equilibrium state. The different elements are expressed by different relaxation tensors and to each tensor corresponds its relaxation time. -- The computation of the strain- and of the deformation-tensor for a heterogeneous isotropic body according to the method of the non-equilibrium states of thermodynamics is performed. The equations (27) for the strain- and the deformation-tensor are derived and compared with Boltzmann's superposition principle for creeping and for relaxation. It is shown that the formula (27) agrees with one of the forms of Boltzmann's principle. On the other hand the general form of Hooke's law follows from (27). Summarizing, the author states that in the presence of the relaxation-time-spectrum the general Hooke's law becomes too cumbersome (derivations of N -th degree occurring, whereas the integral-relations of thermodynamics (27) are considerably more convenient for the solution of various problems.

There are 8 references, all of which are Soviet.

ASSOCIATION: Stalinsk. Sibirskiy metallurgicheskiy institut im. S. Ordzhonikidze
(Stalinsk Siberian Metallurgical Institute imeni S. Ordzhonikidze)

SUBMITTED: June 8, 1957

Card 2/2

1. Elastic shell--Thermodynamic properties
2. Elastic shell
--Stresses

SHERMERGOR, T.D., kand. fiz.-mat. nauk, dotsent

Cyclic deformation of solids with elasticity-toughness properties.

Циклическая деформация твердых тел с упруго-вязкими свойствами.

(MIRA 12:?)

*1. Sibirskiy metallurgicheskiy institut. Rekomendovana kafedroy
fiziki Sibirskogo metallurgicheskogo instituta.*

(Deformation (Mechanics))

(Elasticity)

SOV/126-7-1-22/28

AUTHOR: *Shermergor, T.D.*

TITLE: ~~Absorption of Energy by Steel in Plastic Compression~~
(Pogloshcheniye energii stal'yu pri plasticheskom szhatii)

PERIODICAL: Fizika Metallov i Metallovedeniye, 1959, Vol 7, Nr 1,
pp 146-150 (USSR)

ABSTRACT: The latent energy of two types of steel has been experimentally determined. The specimens for compression were cylindrical: 17 mm diameter and 25 mm high, 20 mm diameter and 30 mm high, and 13 mm diameter and 20 mm high. The last were used for control purposes. Prior to testing, the specimens were annealed in iron filings at 800°C for 3 hours. A study of microsections showed that no carburization of the surface of the specimens had occurred. Compression was carried out in an Amsler press. In order to avoid bending of the specimen, a sleeve was used, which was lined with heat insulators, and supporting plates made from steel 40KhN, 35 x 6 mm. The surface of the supporting plates was polished and the ends of the specimen ground. Compression was carried out in stages. Deformation was carried out statically at a rate of 5% per minute. This made it possible for the flow curve to be taken down by means of

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Absorption of Energy by Steel in Plastic Compression

simultaneous load and deformation readings. The accuracy was within 0.01 mm, which was confirmed by special control experiments - simultaneous visual reading and photographing, using a high sensitivity film at 0.01 sec exposure. The temperature was taken by a copper-constantan thermocouple. One end of the thermocouple was welded into the steel supporting plate, whilst the cold junction was welded into a 20 mm diameter steel specimen. The voltage was transmitted through a wire from the thermocouple to a mirror galvanometer, which enabled the temperature to be registered on a revolving drum (1 revolution - 7 minutes). A typical temperature curve is shown in Fig.1. Here, the system is heated, as a result of deformation, to a maximum, after which it cools under load, and finally cools adiabatically as the result of unloading (sharp drop of the curve). Calibration of the thermocouple by means of a metastatic thermometer has shown that the points lie on a straight line. The energy, ΔE , absorbed in this stage was found as the difference between the work of plastic deformation of this stage, ΔA , and the heat given out, ΔQ . The work ΔA was determined by planimentering the diagram of forces. In the calculation

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Absorption of Energy by Steel in Plastic Compression

of ΔQ the thermal capacity of the system was determined, as well as the rise in temperature due to plastic deformation. Special precautions were taken to prevent errors. The temperature calculation was carried out by a method suggested by M.A. Bol'shanina (Ref.7) and perfected by Benyakovskiy (Ref.8). The latter obtained the following formula for the differential temperature:

$$T = T_1 + (T_2 - T_3) \frac{S_1}{S_3} - \Delta T - T_e$$

where T_1 (see Fig.1) is the maximum temperature of the specimen towards the end of plastic deformation. The second term takes into account a correction for heat removal during deformation. This correction is proportional to the area S_1 . $(T_2 - T_3)/S_3 = \alpha$ is a constant for the rate at which the temperature of the system and the medium evens out. The third term gives a correction for a possible unsteady galvanometer reading and an uneven heating of the system. The last term gives a correction for an elastic adiabatic heating. ΔT and T_e are calculated from

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Absorption of Energy by Steel in Plastic Compression

as a function of deformation are shown. The dependence of the entire absorbed energy on the work of deformation is shown in Fig.3. In Fig.4 the dependence of the entire absorbed energy on true deformation is shown. In Fig.5 the dependence of the differential absorbed relative energy on true deformation is shown. The author concludes that at small degrees of deformation, owing to the smallness of the entire absorbed energy, relaxation processes do not play an important part. Processes responsible for the hardening of material are most important. In the case of large deformations, however, further deformation is accompanied by intense relaxation processes which level out the processes of hardening, and the absorbed energy decreases. There are 5 figures and 11 references, of which 8 are Soviet, 2 English and 1 Japanese.

ASSOCIATION: Sibirskiy metallurgicheskiy institut (Siberian Metallurgical Institute)

SUBMITTED: March 13, 1957 (initially) and
April 15, 1957 (after shortening)

Card 5/5

SHERMERGOR, T.D. (Stalinsk)

Dispersion correlations for elasticity and pliability. PMTF
no.1:96-102 My-Je '60. (MIRA 14:8)
(Elasticity)

SHERMERGOR, T.D. (Stalinsk)

Relations between certain types of deformation. PMTF no.2:150-152
60. (MIRA 14:6)

(Deformations (Mechanics))

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24.4100

S/139/60/000/03/034/045
E073/E335

AUTHOR: Shermergor, T.D.

TITLE: Calculation of the Distribution Function of Relaxation
Constants for Elastic-viscous Bodies 76

PERIODICAL: Izvestiya vysshikh uchebnykh zavedeniy, Fizika,
1960, No 3, pp 185 - 194 (USSR)

ABSTRACT: For calculating the distribution spectrum the author starts off from the thermodynamic equation of non-equilibrium mechanical processes, based on an earlier paper of the author (Ref 3). Disregarding temperature changes, this equation can be written thus (Refs 4,5):

$$\sigma_{ik} = \bar{\sigma}_{ik} + L\psi_{iklm}\dot{\epsilon}_m \quad (1')$$

$$\epsilon_{ik} = \bar{\epsilon}_{ik} - L\psi'_{iklm}\sigma_m \quad (1'')$$

where σ_{ik} and ϵ_{ik} are respectively the stress and strain tensors $\bar{\sigma}_{ik}$ and $\bar{\epsilon}_{ik}$ are their equilibrium values and $\psi_{iklm}(s)$ and $\psi'_{iklm}(s')$ are the tensors of

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S/126/60/009/02/001/033

E031/E335

AUTHOR: Shermergor, T.D.

TITLE: The Calculation of the Distribution Functions of Relaxation Times for Elastic After-effect

PERIODICAL: Fizika metallov i metallovedeniye, 1960, Vol 9, Nr 2, pp 161 - 168 (USSR)

ABSTRACT: Relaxation relations governing the relation of stress and deformation tensors obtained with the aid of irreversible thermodynamic processes are extended to the continuous relaxation spectrum. Expressions are deduced by which the distribution functions of relaxation times can be calculated from the experimental curves $\sigma(t)$ and $\epsilon(t)$ for a number of time dependencies. In the elastic deformation of real bodies relaxation processes can have different intensities and so real bodies possess relaxation spectra. To find the relation between the characteristics of the spectrum and the mechanical properties expressions for the stress and deformation tensors which are obtained with the aid of irreversible thermodynamics ^{processes} are used, the variation of temperature being ignored. These expressions are generalized and

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S/126/60/009/02/001/033

E051/E535

The Calculation of the Distribution Functions of Relaxation Times
for Elastic After-effect

the passage to the limit is made. Further generalisation to the case of a continuous spectrum introduces distribution functions for the relaxation times and relaxation frequencies, in terms of which the above tensors can be expressed. Before calculating the distribution tensors for the relaxation frequencies, it is shown that distribution tensors corresponding to the stress tensor and the deformation tensor are not independent, by considering the loading due to an impulse. The relations obtained are illustrated for the case of a standard linear body. The calculation of the distribution tensors for the relaxation frequencies is illustrated by examples in the first of which the tensor for the velocity of deformation has an exponential form:

$$\dot{\varepsilon}_{\alpha}(t) = \dot{\varepsilon}_{\alpha}^0 \exp(pt) .$$

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S/126/60/009/02/001/033

E031/E335

The Calculation of the Distribution Functions of Relaxation Times
for Elastic After-effect

In the second example the velocity of deformation is constant in the interval $(0, t_1)$, after which the deformation is fixed:

$$\dot{\epsilon}_{ik}(t) = \dot{\epsilon}_{ik}^0 [l(t) - l(t - t_1)] \quad (29)$$

(where $l(t)$ is the unit step function) .
The distribution tensor for relaxation frequencies can be determined from relaxation curves, which are obtained experimentally but it must be remembered that expressions derived are valid only for small deformations, not taking the system beyond the elastic limit. The corresponding cases to those above, when the tensor for the velocity of stress (giving the retardation spectrum) is taken instead of the tensor for the velocity of deformation, are briefly considered.

Card3/4

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89699

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1808,4016

S/139/61/000/001/007/018
E030/E435

AUTHOR: Shermergor, T.D.

TITLE: Calculation of the Distribution Function of Relaxation Constants in Terms of the Real Part of the Complex Elasticity for Visco-Elastic Solids

PERIODICAL: Izvestiya vysshikh uchebny zavedeniy, Fizika, 1961, No.1, pp.77-83

TEXT: A method is developed for calculating the distribution of relaxation times of visco-elastic solids from the frequency dependence of the real part of the elastic modulus. As an example, the distribution is assumed to be

$$\frac{1}{2}(\tanh \alpha x + 1)$$

where α and ω_0 are parameters and $x \equiv \ln \frac{\omega}{\omega_0}$, ω being the radian frequency. This simplified distribution gives very good agreement with experimental results of Ke Tin-Suya on polycrystalline aluminium, as shown in Fig.1 where the abscissa is χ where χ equals $(\chi_0 + x)$ and also equals

$$\ln \frac{\omega}{2\pi a e} \frac{U}{RT}$$

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89699

Calculation of the Distribution ... S/139/61/000/001/007/018
E030/E435

The value of χ_0 giving the best fit to the data is 10.6. ✓
U is the activation energy and T the absolute temperature. In
the general case, the relaxation spectrum is obtained by Fourier
decomposition from the modulus M at a radian frequency ω as
follows. The real modulus is given as

$$M'(\omega) - M^0 = \int_0^{\infty} \frac{\omega^2}{s^2 + \omega^2} \psi(s) ds \quad (2)$$

where the form of $\psi(s)$ must be found. The value of $\frac{dH(x)}{dx}$
is calculated, called $P(x)$, and transformed to

$$\bar{P}(u) = \bar{G}(u)\bar{F}(u) \quad (8)$$

where

$$G(u) = \frac{1}{2} \int_{-\infty}^{\infty} \frac{e^{iut}}{\cosh^2 t} dt \quad (9)$$

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Calculation of the Distribution ... S/139/61/000/001/007/018
E030/E435

and the function $\bar{F}(u)$ so determined is then transformed back to $F(y)$. $F(y)$ gives the required distribution since it is shown that

$$H(x) = \int_{-\infty}^{\infty} K(x-y)F(y)dy \quad (5)$$

where

$$K(x-y) \equiv \frac{1}{2} (\text{th}\{x-y\} + 1)$$

By taking first and second moments of the redistribution function $F(y)$, it is shown that the first moment is zero and the second is

$$\frac{\pi^2}{12} \left(\frac{1}{\alpha^2} - 1 \right)$$

and it is also seen that $w_0 = s_0$. Curves of the relaxation constant distribution for polycrystalline aluminium are evaluated and plotted. There are 2 figures and 7 references: 6 Soviet and 1 non-Soviet.

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S/207/62/000/006/016/025
EO31/E492

AUTHORS: Meshkov, S.I., Shermorgor, T.D. (Voronezh)

TITLE: On the temperature dependence of the internal friction of a torsional pendulum

PERIODICAL: Zhurnal prikladnoy mekhaniki i tekhnicheskoy fiziki, no.6, 1962, 98-104

TEXT: Assuming small oscillations, distortion of transverse sections of the pendulum column as it twists can be neglected. The equation for the oscillations is solved by using the integral Laplace transform. The form of the solution depends on the character of the roots of a cubic equation the discriminant of which can be written in the form

$$D_n = q_n^2 + m_n^3.$$

Damped oscillations occur if D_n is greater than zero. The cases m_n greater than zero and m_n less than zero are considered. If $D_n < 0$ the motion of the pendulum is aperiodic. The temperature dependence of internal friction is measured by the tangent of the angle of phase shift between the stress and the deformation. It is shown that the expressions for the tangent calculated from a rheological model and from the above solution

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On the temperature ...

S/207/62/000/006/016/025
E031/E492

almost completely coincide, so that for the analysis of experimental data the rheological model can be used. Both methods give the same value of the temperature at which the oscillations cease to be periodic and become aperiodic. This temperature depends on both the physical properties of the material of the pendulum and on the geometry of the system. There are 2 figures. ✓

SUBMITTED: May 3, 1962

Card 2/2

SHERMERGOR, T.D.; MESHKOV, S.I.

Description of the background of internal friction during
torsional vibrations. Fiz. met. i metalloved. 13 no.6:817-822
Je '62. (MIRA 15:7)

1. Voronezhskiy tekhnologicheskii institut.
(Internal friction)

ACCESSION NR: AR4042232

8/0124/64/000/006/V033/V033

SOURCE: Ref. zh. Mekhanika, Abs. 6V245

AUTHOR: Shermergor, T. D.

TITLE: Temperature relaxation in solid bodies

CITED SOURCE: Sb. Relaksats. yavleniya v met, i splavakh. M., Metallurgizdat, 1963, 27-30

TOPIC TAGS: absorption coefficient, temperature relaxation, irreversible process, irreversible process thermodynamics, heat conduction equation

TRANSLATION: Gives a comparison of two calculation methods of absorption coefficient, one of which is based on thermodynamics of irreversible processes, and the other - on the use of heat-conduction equation. Considers propagation of a flat longitudinal wave in an unlimited isotropic medium, in which the only relaxation mechanism is thermal conduction. It is found that for high frequencies the wave is isothermal, and for small - adiabatic; the propagation speed of these waves is determined. Gives a comparison of considered temperature relaxation with behavior

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ACCESSION NR: AR4042232

of a standard linear body, expressions for adiabatic modulus of manifold compression, and relaxation time, caused by relaxation of heat flow in a longitudinal wave. Expressions for internal friction, coefficient of absorption, and its temperature part at low frequencies are obtained. For usual sonic and ultrasonic frequencies the longitudinal wave can be considered adiabatic. A general expression is given for stress tensors in the case when, in the considered frequency range, there can also occur other relaxation processes (defects of moduli and relaxation times determine the relaxation mechanism, which is not caused by thermal conduction).

SUB CODE: TD, ME

ENCL: 00

Card

2/2

ACCESSION NR: AR4043999

S/0058/64/000/006/EO41/EO41

SOURCE: Ref. zh. Fizika, Abs. 6E307

AUTHOR: Shermergor, T. D.

TITLE: The phenomenological theory of internal friction

CITEE SOURCE: Sb. Relaksats. yavleniya v met. i splavakh. M., Metallurgizdat, 1963, 33-39

TOPIC TAGS: internal friction, thermodynamic theory, irreversible process, nonequilibrium stress tensor, deformation, isotropic medium

TRANSLATION: On the basis of the thermodynamic theory of irreversible processes there is obtained an expression for the nonequilibrium stress tensor during small deformations of a uniform isotropic medium. It is proposed that in the medium is active only one relaxation mechanism (diffusion, grain-boundary, dislocation, etc.). The obtained expression is generalized for the case of a heterogeneous medium (for simplicity, calculations are given only for the stress deviator). There is given a calculation of the relaxation-time spectrum.

SUB CODE: SS, TD

ENCL: 00

Card 1/1

SHERMERGOR, T.D.

Third all-Union interuniversity conference on relaxation
phenomena in metals and alloys. Izv. vys. ucheb. zav; fiz.
no.1:176 '63. (MIRA 16:5)

1. Voronezhskiy gosudarstvennyy universitet.
(Metals—Congresses)

MESHKOV, S.I. (Voronezh); SHERMERGOR, T.D. (Voronezh)

High-temperature internal friction in the case of longitudinal oscillations. PMTF no.3:20-25 My-Je '63. (MIRA 16:9)
(Thermodynamics) (Irreversible processes)

L 13001-65 ENT(m)/EMP(w)/ENA(d)/ENP(t)/ENP(b) JD

ACCESSION NR: AR4046008

S/0058/64/000/007/E033/E033

SOURCE: Ref. zh. Fizika, Abs. 7E246

AUTHORS: Shermergor, T. D.; Meshkov, S. I.

TITLE: Phenomenological description of high-temperature internal friction

CITED SOURCE: Sb. Relaksats. yavleniya v. met. i splavakh. M., Metallurgizdat, 1963, 46-52

TOPIC TAGS: internal friction,¹⁸ shear stress, shear resistance, torsion, stress relaxation, model theory

TRANSLATION: A physical analysis of the models used for a phenomenological description of high-temperature internal friction (IF) is presented. Rheological models are considered and it is shown that in spite of their simplicity and clarity, they cannot be recom-

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ACCESSION NR: AR4046008

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mended for the calculation of the temperature dependence of IF. It is found that in order to describe IF in a region situated sufficiently far from the point of transition to aperiodicity, use can be made of a rheological model; at higher temperatures it becomes necessary to solve the boundary problem on the basis of the general equation for the stress tensor. The IF background is due to relaxation of the shear stresses, while the relaxation of the body stresses produces only an IF peak. The shear deformations take place under both torsional and longitudinal or flexural oscillations, so that the IF background should appear also in these types of damped oscillations.

SUB CODE: SS, MM

ENCL: 00

Card 2/2

MESHAOV, S. I. (Voronezh); POSTNIKOV, V. S. (Voronezh); SHERMERGOR, T. D.
(Voronezh)

Temperature dependence of the internal friction of a standard
linear solid under heavy damping conditions. Izv. AN SSSR.
Mekh. i mashinostr. no.3:90-95 '64 My-Je ' (MIRA 17:')

L 17117-65 EWT(m)/EWP(b)/EWP(t) — SSD/ASD(m) — 3/AFWL — JD

ACCESSION NR: AP5000643

S/0181/64/006/012/3502/3508

AUTHOR: Turkov, S K.; Shermergor, T. D.

TITLE: Internal friction in the interaction between impurity atoms and edge dislocations

SOURCE: Fizika tverdogo tela, v. 6, no. 12, 1964, 3502-3508

TOPIC TAGS: dislocation study, dislocation motion, internal friction, impurity movement, edge dislocation

ABSTRACT: The authors calculate the internal friction due to the diffusion of impurity atoms in the stress field of an edge dislocation that executes harmonic oscillations in the slip plane under the influence of an external force. An oscillation amplitude averaged over the dislocation length is used to simplify the calculations, and inertial forces are neglected. The frequency and concentration dependences of the internal friction due to this mechanism are investigated and no limitation is imposed on the impurity concentration. The results show that the dependence of the internal friction on the impurity concentration and on the free length of the dislocation is more complicated than obtained by

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L 17117-65

ACCESSION NR: AP5000643

J. O. Kessler (Phys. Rev. v. 106, 654, 1957). At large impurity concentrations the internal friction is inversely proportional to the concentration and does not depend on the free dislocation length. In the case of low concentrations and for high frequencies the results are close to those of Kessler. At very high frequencies, account must be taken of the inertial forces. Orig. art. has: 3 figures and 28 formulas.

ASSOCIATION: Voronezhskiy politekhnicheskii institut (Voronezh Polytechnic Institute).

SUBMITTED: 21Apr64

ENCL: 03

SUB CODE: SS

NR REF SOV: 002

OTHER: 004

Card 2/2

DARINSKIY, B.M.; SHERMERGOR, T.D.

Temperature relaxation in cubic structure polycrystals. Fiz.met.
i metalloved. 18 no.5:645-653 N '64.

(MIRA 18:4)

1. Voronezhskiy politekhnicheskii institut.

L 7082-66 EWT(m)/T/EWP(t)/EWP(h)/EWA(c) JD

ACC NR: AF5027274

SOURCE CODE: UR/0207/65/000/005/0084/0089

AUTHORS: Darinskiy, B. M. (Voronezh); Shermargor, T. D. (Voronezh)

ORG: none

TITLE: On the theory of diffusion relaxation in polycrystals

SOURCE: Zhurnal prikladnoy mekhaniki i tekhnicheskoy fiziki, no. 5, 1965, 84-89

TOPIC TAGS: solid state, polycrystal, diffusion relaxation, crystal

ABSTRACT: This paper is an extension of the theory of diffusion relaxation in polycrystals, first proposed by K. Ziner (Sb. "Uprugost' i neuprugost' metallov" Izd. inostr. lit., 1954). The authors present an exact calculation of the intensity of the relaxation process in polycrystals of arbitrary crystallographic symmetry by taking into account pair correlation of K. Ziner between crystal nuclei. Calculations are based on the set of equations which describe an elastic-diffusion system

$$\nabla_i D_{ik} \nabla_k c - \frac{\partial c}{\partial t} - \frac{V_0}{RT} \nabla_i c D_{ik} \nabla_k b_{lm} u_{lm} = -q \quad (1.1)$$

$$\nabla_k \lambda_{iklm} u_{lm} - \nabla_k b_{ik} c = -f_i \quad (1.2)$$

$$c = n/N, \quad b_{ik} = \partial \sigma_{ik} / \partial c = \lambda_{iklm} \gamma_{lm}, \quad \gamma_{lm} = \partial \epsilon_{lm} / \partial c \quad (1.3)$$

$$D_{ik} = D_{ik}^0 \left(1 + \frac{\partial V_0}{\partial T} c \right), \quad \beta = \lambda_{iklm} \gamma_{ik} \gamma_{lm}, \quad \epsilon_{lm} = 1/2 (u_{lm} + u_{ml})$$

Card 1/2

L 7082-66

ACC NR: AP5027274

Here c is the concentration of impurity atoms, n and N the number of impurity atoms and total atoms per unit volume respectively, D_{ik} - coefficient of diffusion, D_{ik}^0 its value at $c \rightarrow 0$, b_{ik} and γ_{ik} - concentration tension and deformation tensors respectively, V_0 - the molar volume, R - the gas constant $u_{ik} = u_{i,k}$ - distortion tensor, u - the displacement vector, ϵ_{ik} - deformation tensor, q - strength of impurity atoms source, and f - force density. The authors derive expressions for: a) the degree of relaxation (first order approximation), b) complete defects in the moduli for overall compression and shear, and c) the time relaxation distribution function. The derived expressions are applied to the system Fe - C containing 4.5% at 1250C. The calculations for this system yield the degree of relaxation $\frac{\Delta\mu}{\mu} = 1.5 \times 10^{-3}$ and $D = 3.2 \times 10^{-6}$ sec/cm². For crystallites of $\sim 10^{-3}$ cm diameter, the peak of inner friction corresponds to a frequency of ~ 1 cycle/sec. A derivation for ascending diffusion for a nonhomogeneous anisotropic medium is appended. Orig. art. has: 42 equations.

SUB CODE: GC/ SUBM DATE: 13Dec64/ ORIG REF: 010/ OTH REF: 003

nw

Cond 2/2

MESHKOV, S.I. (Voronezh); SHERMERGOR, T.D. (Voronezh)

Temperature dependence of the damping ratio of a standard linear body.
Izv. AN SSSR. Mekh. no.5:103-106 S-2 '65. (MIRA 18:10)

L 3344-66 ENT(1)/ENT(m)/T/ENT(t)/ENT(b)/ENT(c) IJP(c) JD/JG/GG
 ACCESSION NR: AP5017299 UR/0181/65/007/007/2064/2069
 AUTHORS: Turkov, S. K.; Shermergor, T. D.
 TITLE: Internal friction in a face-centered cubic lattice, due to reorientation of bivacancies
 SOURCE: Fizika tverdogo tela, v. 7, no. 7, 1965, 2064-2069
 TOPIC TAGS: internal friction, crystal lattice structure, crystal vacancy
 ABSTRACT: The purpose of the paper was to calculate theoretically the internal friction produced by the reorientation of bivacancies in an external field, and to investigate the peculiarities of the internal-friction peak produced by these bivacancies. The authors determine the kinetics of the internal friction due to the change in the concentration of the bivacancies having a specified orientation under the influence of applied external stresses. It is shown that the width of the bivacancy internal-friction peak depends essentially on the orientation of the crystallographic axes relative to the ap-
 Card 1/2

L 3344-66

ACCESSION NR: AP5017299

plied stress. The amount of lattice distortion is calculated to estimate the magnitude of the relaxation peak. It is shown that the reorientation of the bivaancies is characterized in general by two relaxation times, differing by a factor of approximately 1.5. The results are compared with experiment for copper, silver, and gold. It is concluded that to reconcile the experimental and theoretical data it is necessary to assume that during the quenching an appreciable part of the vacancies condenses into bivaancies. Orig. art. has: 20 formulas and 1 table.

ASSOCIATION: Voronezhskiy politekhnicheskii institut (Voronezh Polytechnic Institute)

SUBMITTED: 18Jan65

ENCL: 00

SUB CODE: SS

NR REF SOV: 000

OTHER: 006

Card 2/2 DP

TURKOV, S.K.; SHERMERGOR, T.D.

Effect of the stress tuning on the high-temperature background of
internal friction. Fiz. tver. tela 7 no.10:2952-2957 0 '65.
(MIRA 18:11)

1. Voronezhskiy politekhnicheskii institut.

L 23677-66 ENT(m)/T/EWP(t) IJP(c) JD

ACC NR: AR6005218

SOURCE CODE: UR/0058/65/000/009/EO57/EO58

AUTHOR: Meshkov, I. S.; Shermergor, T. D.

TITLE: On the description of the internal friction in solid bodies with the aid of rheological models

SOURCE: Ref. zh. Fizika, Abs. 9E489

REF SOURCE: Izv. Voronezhsk. gos. ped. in-ta, v. 44, 1964, 116-123

TOPIC TAGS: internal friction, rheologic property, shear stress, relaxation process, elastic deformation, hydrostatic pressure

TRANSLATION: It is shown on the basis of an analysis of experimental results that to describe the relaxation of shear stresses it is necessary to use a rheological model of the Maxwellian type, and for bulk stresses the model of standard linear body (with a single relaxation time). Expressions are obtained for the internal friction (IF) and the dynamic moduli under shear and bulk deformations, and also for the case of a tension-compression deformation. In the latter case the form of the dependence, and consequently also the form of the dependence of IF, is determined by the ratio of the relaxation times, corresponding to the shear and to the hydrostatic compression. Certain generalizations are made for more complicated rheological models. V. Verner

SUB CODE: 20

Card 1/1 *FW*

L 26622-66 EWT(1)/EPF(n)-2/ETC(m)-6 IJP(c) WW

ACC NR: AP5025371

SOURCE CODE: UR/0181/65/007/010/2952/2957

AUTHOR: Turkov, S. K.; Shermergor, T. D.

ORG: Voronezh Polytechnic Institute (Voronezhskiy politekhnicheskiy institut)

TITLE: The effect of stress distribution on high-temperature noise due to internal friction

SOURCE: Fizika tverdogo tela, v. 7, no. 10, 1965, 2952-2957

TOPIC TAGS: internal friction, metal, stress distribution, crystal vacancy

ABSTRACT: The high temperature element of internal friction of metals represents a series of peaks superposable on a curve growing monotonically with an increase in temperature. The high temperature noise caused by vacancy diffusion between block boundaries or crystal grains was calculated. Unlike the similar Escaig calculation the possibility of stress redistribution caused by the irregularity of diffusion currents is considered. This leads to a considerable increase in noise in the mean frequency ranges. With low frequencies of ω internal friction in both cases $\sim \frac{1}{\omega}$, with high frequencies $\sim \frac{1}{\sqrt{\omega}}$. Orig. art. has:

Card 1/2

L 26622-66

ACC NR: AP5025371

2 fig. and 29 formulas.

SUB CODE: 20, // SUBM DATE: 12Apr65/ ORIG REF: 005/ OTH REF: 004

Card 2/2

L 11725-66 ENT(1)/ENT(m)/T/ENP(t)/ETI IJP(c) JD/JW/00

SOURCE CODE: UR/0181/66/008/006/1670/1676

ACC NR: AP6018524

AUTHOR: Turkov, S. K.; Shermergor, T. D.

ORG: Voronezh Polytechnic Institute (Voronezhskiy politekhnicheskiy institut)

TITLE: Effect of screw dislocations on the internal friction of para-elastic bodies

SOURCE: Fizika tverdogo tela, v. 8, no. 6, 1966, 1670-1676

TOPIC TAGS: crystal dislocation phenomenon, internal friction, crystal vibration, elasticity theory, elastic modulus, crystal lattice distortion

ABSTRACT: In view of the fact that the mechanism of vibration-dislocation energy dissipation by the elastic-polarization cloud produced in para-elastic bodies, the authors calculate the internal friction due to the deceleration of vibrating screw dislocations by relaxation of their stress fields in a medium possessing properties of a standard linear body. It is assumed that the elastic polarization of the medium is the only effective damping mechanism. The screw dislocations are assumed to vibrate under the influence of periodic external stresses and the amplitudes of their oscillations are considerably smaller than the distances between the oscillation nodes. The relation between the internal friction of this type and the defect of the modulus of the medium or the amplitude of the applied stress is determined and it is shown that the ratio of the height of the dislocation peak to the peak of the dislocation-free body decreases both with increasing defect of the modulus of the medium, and with increasing amplitude of the applied stress. The results are found to be similar to

Card 1/2

S/081/62/000/018/048/059
B160/B186

AUTHORS: Vizel', A. O., Shermergorn, I. M., Tyulenev, S. S.

TITLE: Synthesis of polyethylene terephthalate

PERIODICAL: Referativnyy zhurnal. Khimiya, no. 18, 1962, 503,
abstract 18P62 (In collection: Materialy 1-y
Konferentsii molodykh nauchn. rabotn. g. Kazani, 1959.
Sekts. khim. Kazan', 1960, 27-34)

TEXT: Ways of reducing the amount of glycol brought into the reaction and of replacing purified N_2 by commercially pure N_2 or air were investigated in order to develop a technology for the production of polyethylene terephthalate (PETP) using terephthalic acid dimethyl ester (DMT) as the raw material. These investigations proved that the consumption of ethylene glycol can be reduced (from three mols to two) by introducing the DMT part at a time, and that it is possible to use commercially pure N_2 or air (instead of purified N_2), triphenyl phosphate (I) at the rate of 0.4-3% of the DMT being used as the antioxidant. The relation of the

Card 1/2

Synthesis of polyethylene . . .

S/081/62/000/018/048/059
B160/B186

reaction rate and quality of the product obtained to the amount of I introduced was studied (the optimum amount of I being 0.75% of the amount of DMT). A new solvent (40% phenol and 60% dichlorethane), which has good solvent ability at about 20°C, was found for determining the molecular weight of the PETP from the viscosity and for fractionation of the polymer. [Abstracter's note: Complete translation.]

Card 2/2

KUZNETSOV, Ye.V.; VIZEL', A.O.; SHERMERCORN, I.M.; TYULENEV, S.S.

Relation between the molecular weight of polyethylene terephthalate and the viscosity of its solutions in a mixture of phenol and dichloroethane. Vysokom. soed. 2 no.2:205-209 F '60. (MIRA 13:11)

1. Kazanskiy khimiko-tekhnologicheskii institut.
(Terephthalic acid)

KUZNETSOV, Ye.V.; SHERMERGORN, I.M.; BELYAYEVA, V.A.

Synthesis of polyesters based on trivalent phosphorus acids by
condensation polymerization at the interface. Trudy KKHTI no.30:
70-76 '62. (MIRA 16:10)

KUZNETSOV, Ye.V.; VIZEL', A.O.; TYULENEV, S.S.; SHERMERGORN, I.M.

Stabilization of polyethylene terephthalate. Trudy KKHTI no.30:
82-88 '62. (MIRA 16:10)

ACCESSION NO: AP4009146

S/0190/64/006/001/0031/0033

AUTHORS: Kuznetsov, Ye. V.; Gil', A. P.; Shermergorn, I. M.; Kuznetsova, S. F.

TITLE: Synthesis of polyesters and polyamides on the basis of nitrophthalic acids by interfacial polycondensation

SOURCE: Vy*sokomolekulyarny*ye soyedineniya, v. 6, no. 1, 1964, 31-33

TOPIC TAGS: synthesis, polyester, polyamide, polycondensation, interfacial polycondensation, nitrophthalic acid, dichlorides of nitrophthalic acids, terephthalic acid

ABSTRACT: Solutions containing 0.2 Mol/liter of dichlorides of terephthalic-, nitroterephthalic-, 4-nitrophthalic-, and 5-nitrophthalic acids in *n*-xylene were reacted with aqueous solutions of 2,2-di-(4-oxyphenyl)propane (OPP) or hexamethylenediamine (HMD) of the same molar concentration in the presence of 0.45 Mol/liter of NaOH. The synthesis was conducted in a flask, with 10 minutes of energetic mechanical stirring. Following this, the obtained polyesters or polyamides were separated by filtration, washed with water, and dried to constant weight. The yield of the polyesters, obtained by the interaction of the dichlorides of nitroterephthalic and 4-nitrophthalic acids with OPP amounted to 86.8 and 36%, their

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ACCESSION NO: AP4009146

respective specific viscosities for 0.5% solutions in tricresol averaging 0.072 and 0.019. As to the polyamides synthesized from the dichlorides of nitroterephthalic-, 4-nitrophthalic-, and 3-nitrophthalic acids with HMD, their yields amounted to 88.0, 84.2, and 76.6%, with respective specific viscosities of 0.5% solutions in concentrated sulfuric acid averaging 0.352, 0.280, and 0.223. The higher yields and viscosities registered in the polyesters derived from the dichloride of nitroterephthalic acid as compared with the ones obtained on the basis of the dichloride of 4-nitrophthalic acid is attributed by the authors to the fact that the latter ingredient has its nitro group located in a meta-position in respect to the chloride group. A similar trend, although on a less pronounced scale, was observed in polycondensation products of dichlorides of nitrophthalic acids with HMD. Orig. art. has: 2 tables.

ASSOCIATION: Kazanskiy khimiko-tekhnologicheskii institut im. S. M. Kirova (Kazan Chemical-Technological Institute)

SUBMITTED: 07Jul62

DATE ACQ: 10Feb64

ENCL: 00

SUB CODE: CH

NO REF SOV: 006

OTHER: 003

Card 2/2

A L 11522-66 EWT(m)/EWP(1) RM
ACC NR: AP6001872 SOURCE CODE: UR/0190/65/007/012/2156/2159

AUTHORS: ⁴⁴⁵⁵ Shermergorn, I. M.; ⁴⁴⁵⁵ Kamardin, Yu. B.

ORG: ⁴⁴⁵⁵ Institute for Organic Chemistry, AN SSSR, ⁴⁴⁵⁵ Kazan' (Institut organicheskoy khimii AN SSSR)

TITLE: A study of interfacial esterification of polyvinyl alcohol

SOURCE: Vysokomolekulyarnyye soyedineniya, v. 7, no. 12, 1965, 2156-2159

TOPIC TAGS: esterification, polyvinyl alcohol, polymer, ~~polymerization degree~~, reaction mechanism, ~~chloride~~

ABSTRACT: The interphase esterification of polyvinyl alcohol with benzoyl chloride was studied. The effects of different organic solvents and different concentrations of benzoyl chloride on the degree of esterification were determined. The esterification was carried out by adding NaOH and benzoyl chloride (dissolved in an organic solvent) to an aqueous solution of polyvinyl alcohol, and by rapid stirring of the resultant mixture. The experimental results are presented in tables and graphs (see Fig. 1). It was found that substitution of KOH for NaOH had a negligible effect on the degree of esterification. The degree of esterification increased with the solubility of the polyvinyl benzoate in the organic solvent and with increase of the alkali concentration in the aqueous phase, but it was independent of the temperature and the duration of reaction. The experimental results are interpreted

UDC: 541.64+678.01:54+678.744

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L 11522-66

ACC NO: AP6001872

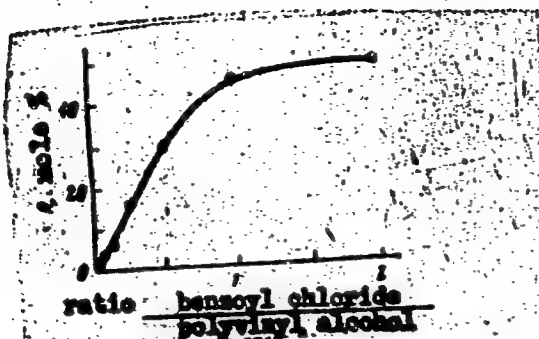


Fig. 1. Relation between the degree of esterification (A) of polyvinyl alcohol on the ratio of benzoyl chloride to polyvinyl alcohol.

in terms of a diffusion-solubility mechanism. Orig. art. has: 3 tables and 1 graph.

SUB CODE: 11/ SUBM DATE: 01Feb65/ ORIG REF: 004/ OTH REF: 004

Card 2/2

L 8507-66 EWT(m)/EWP(j) RM

ACC NR: AP5028489

SOURCE CODE: UR/0286/65/000/020/0066/0066

AUTHORS: Kuznetsov, Ye. V.; Shermergorn, I. M.; Vagapova, A. K.

ORG: none

TITLE: A method for obtaining polyphosphites. Class 39, No. 175655

SOURCE: Byulleten' izobreteniy i tovarnykh znakov, no. 20, 1965, 66

TOPIC TAGS: phosphorus compound, alkyl, aryl, phenol, xylene, nitrogen

ABSTRACT: This Author Certificate presents a method for obtaining polyphosphites by polycondensation of alkyl(aryl)dichlorophosphites and diphenols. To simplify the technique of obtaining the above compounds, polycondensation is conducted in a xylene solution. Nitrogen is constantly blown through the reacting mass during its polycondensation.

SUB CODE: 07/ SUBM DATE: 07Jun63

BVK
Card 1/1

UDC: 678.673;678.85

ACC NR: AP003.1906

SOURCE CODE: UR/0062/66/000/009/1654/1655

AUTHOR: Bel'skiy, V. Ye.; Yefremova, M. V.; Shermergorn, I. M.

ORG: Institute of Organic and Physical Chemistry im. A. Ye. Arbuzov, Academy of Sciences, SSSR (Institut organicheskoy i fizicheskoy khimii Akademii nauk SSSR)

TITLE: Kinetics of the hydrolysis of bis(chloromethyl)phosphinic acid esters

SOURCE: AN SSSR. Izvestiya. Seriya khimicheskaya, no. 9, 1966, 1654-1655

TOPIC TAGS: herbicide, bischloromethylphosphinic acid ester hydrolysis, hydrolysis kinetics, hydrolysis, chemical kinetics, ester, phosphinic acid, alkyl radical

ABSTRACT: Kinetics of the hydrolysis of the biologically active esters of bis(chloromethyl)phosphinic acid in water were studied at 75—95°C. The experimental values of the pseudomolecular reaction rate constants k are given in Table 1.

Card 1/3

UDC: 541.127+542.938+661.718.1

ACC NR: AP6032906

Table 1. Effect of radical R in the esters
 $(CH_2Cl)_2P(O)OR$ on the rate of hydrolysis in
 water at various temperatures

No.	R	k · 10 ³ , sec ⁻¹				
		95°	90°	84.5°	80°	75°
1	CH ₃	28,9	21,8	14,3	9,31	6,13
2	C ₂ H ₅	11,2	8,43	5,36	3,25	2,20
3	n-C ₃ H ₇	7,66	5,21	3,36	2,23	—
4	i-C ₃ H ₇	7,14	4,58	3,03	2,00	—
5	n-C ₄ H ₉	6,13	3,96	—	1,75	1,08
6	n-C ₅ H ₁₁	5,49	3,83	2,50	1,53	1,00
7	i-C ₄ H ₉	1,73	1,23	0,766	0,474	—
8	neo-C ₄ H ₉	0,666	0,449	0,300	—	—
9	phenyl	7,05	5,07	—	2,76	—
10	allyl	283	211	142	100	66,1

The results showed that the reaction rate of the hydrolysis depends on the nature of the alcohol radical in the ester and for the alkyl radicals in the acid it is determined by the steric factors.

Card 2/3

ACC NR: AP6032906

The temperature dependence of the hydrolysis is described by the Arrhenius equation with the parameters shown in Table 2.

[WA-50; CBE No. 12]

Table 2. Dependence of the activation E observed, and preexponential factor A on the nature of the radical R in the esters $(CH_2Cl)_2P(O)OR$

R	CH ₃	C ₂ H ₅	n-C ₃ H ₇	iso-C ₃ H ₇	n-C ₄ H ₉
E, kcal/m	21,2	21,8	21,9	21,7	22,0
log A	8,03	8,02	7,89	7,73	7,84
R	n-C ₃ H ₇	i-C ₃ H ₇	neo-C ₃ H ₇	phenyl	allyl
E, kcal/m	22,0	22,7	20,6	16,0	19,5
log A	7,81	7,74	6,04	4,32	8,04

SUB CODE: 07/ SUBM DATE: 14Feb66/ ORIG REF: 002/ OTH REF: 001

Card 3/3

SHERMERINSKIY, V. V., TRUFYAKOV, V. I.

Welding

Joining cross and longitudinal girders in all-welded bridges with lower roadway. Avtom. svar. 4, No. 4(19), 1951.

9. Monthly List of Russian Accessions, Library of Congress, June 1952 ~~1953~~, Uncl.

SHERMETEEVA, T. V.

USSR/Chemistry - Camphor
Chemistry - 4-Phenyl camphor

Feb 1947

"Investigations in the Field of Phenyl Camphor and Its Derivatives: IV,
Some Derivatives of 4- Phenyl Camphor," S. S. Nametkin, T. V. Shermeteeva,
8 pp

"Zhur Obshch Khim" Vol XVII, No 2

A simplification of the previously published method of obtaining 4- phenyl
camphor, and new data on the synthesis and characteristics of the previously
described derivatives of this compound.

PA 15T51

5 HERMET'YEV, M.P.

16(1) 10(2)	PLANE I BOOK EXPLOITATION	507/2699
	Academy nauk SSSR. Institut matematiki	
	Inzhenernyy sbornik, t. 25 (Engineering Symposium, Vol. 25) Moscow, Izdatvo AN SSSR, 1959. 218 p. Krieta slip inserted. 2,500 copies printed.	
	Ed.: A.A. Il'yushin; Ed. of Publishing House: D.M. Ioffe; Tech. Ed.: Ye. V. Mikhlin.	
	PURPOSE: This book is intended for applied mathematicians, physicists and engineers.	
	CONTENTS: The book is a collection of articles published by the Department of Engineering Sciences of the Institut matematiki (Institute of Mechanics) of the Academy of Sciences, USSR. The articles discuss various aspects of the mechanics of materials and of fluid mechanics, such as stress and bending of beams, shells, plates and rods, supersonic gas flows, vibrations, etc. The problems are treated in a highly theoretical, i.e., mathematical, manner. References are given at the end of each article.	
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	Karyukhin, V.A. On the Displacement of a Water-Oil Contact in Formation With Bottom Water	200

S/130/61/000/010/002/004
A006/A101

AUTHORS: Rabinovich, D. M., Head of the rolling laboratory, Skakun, V. V.
Head of the rail and structural mill shop, Shermeyster, M. S.
Head of the department of heating devices

TITLE: Experiences in the production of high-wear-resistant rails

PERIODICAL: Metallurg, no. 10, 1961, 25-26

TEXT In order to bring about full heat treatment of rails, including both volumetric quenching and tempering, an experimental industrial unit was constructed at the Nizhne-Tagil' Plant in 1960. The unit consists of a high-speed section furnace and an oil quenching mechanism. The ten sections of the furnace are arranged in a line at 1,600 mm distance from each other and are covered with special drums containing water-cooled pipes to transport the rails along the furnace. Each section consists of a metal frame with a special refractory-lined chamber. The rails are heated by 8 double-conduct short-flame torches fuelled with coke gas, which are arranged alternatingly on both sides. The rails are moved back and forth within the furnace. The quenching unit consists of an oil tank over which a quenching traverse is fixed. The traverse

Card 1/3

Experiences in the production ...

S/130/61/000/010/002/004
A006/A101

is a metal structure with a built-in roller conveyer and a drive for lifting and dropping the structure into the tank. The following technological process was developed: the rails are supplied to the thermal span, placed onto the roller conveyer and supplied to the quenching furnace. They are then placed by special guides between the beads of the upper conveyer roll. The rail moves along the furnace during 9 - 11 minutes. After heating to 890 - 920°C, it is supplied at 30 m/min speed to the receiving roller-conveyer of the quenching traverse where it is held in air for 30 - 60 sec. When a temperature of 820 - 860°C has been reached the rail and the traverse are dipped into the quenching oil tank for 4 - 6 minutes. After the oil has dripped off, the finished rails are packed by 3 - 4 pieces and supplied to the isothermal furnace for tempering during 2 hours at 420 - 520°C. The quality of such heat-treated rails is very high. Comparative values for the properties of heat-treated and not heat-treated rails are shown in the table below.

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S/130/61/000/010/002/004
A006/A101

Experiences in the production ...

Properties	Rails	
	heat-treated	not heat-treated
Yield limit, kg/mm ²	79.5	44.0
Ultimate strength, kg/mm ²	123.0	83.5
Relative elongation, %	11.0	11.7
Relative constriction, %	33.5	15.8
Toughness at + 20°C, kgm/cm ²	3.7	2.0
Hardness HPB	3.2	3.9
Deflection during tests on the ram, mm	26.0	43.0
Wear resistance (from losses in the specimen weight), g	0.720	1.746

The costs of heat-treated rails exceed those of conventional rails by a factor of 3. There are 2 figures and 1 table.

ASSOCIATION: Nizhne-Tagil'skiy metallurgicheskiy kombinat (Nizhne-Tagil' Metallurgical Combine)

Card 3/3

ARSEYEV, A.V.; GOLOVANOV, Yu.M.; SHERMEYSTER, M.Sh.

Burner for annealing tires. Sbor. rats. predl. vnedr. v
proizv. no.2:36 '61. (MIRA 14:7)

1. Nizhne-Tagil'skiy metallurgicheskiy kombinat.
(Gas burners)

SHVETSOV, Ye.M.; SHERMEYSTER, M.S.

Redesign of triple-fired holding furnaces. Metallurg 6
no.10:26-28 0 '61. (MIRA 14:9)

1. Sortoprokatnyy tsekh Nizhne-Tagil'skogo metallurgicheskogo kombinata.
(Furnaces, Heating)

RABINOVICH, D.M.; SHAKUN, V.V.; SHERMEYSTER, M.S.

Manufacture of rails with improved wear resistance. Metallurg
6 no.10:25-26 0 '61. (MIRA 14:9)

1. Nizhe-Tagil'skiy metallurgicheskiy kombinat. 2. Nachal'nik
prokatnoy laboratorii Nizhne-Tagil'skogo metallurgicheskogo
kombinata (for Rabinovich). 3. Nachal'nik rel'sobalochnogo
stana Nizhne-Tagil'skogo metallurgicheskogo kombinata (for
Skakun). 4. Nachal'nik uchastka nagrevatel'nykh ustroystv
Nizhne-Tagil'skogo metallurgicheskogo kombinata (for Shermeyster).
(Rolling (Metalwork)) (Railroads—Rails)

Ussat
AKRAMOV, Z.M., kand. geogr. nauk; RAKITNIKOV, A.N., kand.
geograf. nauk; ZAMKOV, O.K., kand. geograf. nauk;
SHERMUKHAMEDOV, A.M. [deceased]; SAUSHKIN, Yu.G., doktor
geograf. nauk, prof, otv. red.; DEGTYAR', V.I., red.;
KHISAMOV, A.V., kand. geograf. nauk, red.;
ASTAKHOV, A., red.; GOR'KOVAYA, Z.P., tekhn. red.

[Agricultural geography of Samarkand and Bukhara Provinces]
Geografiia sel'skogo khoziaistva Samarkandskoi i Bukharskoi
oblasti. [By] Z.M. Akramov i dr. Tashkent, Izd-vo Akad. nauk
UzSSR. Pt.2. 1961. 323 p. (Materialy Zeravshanskoi ekspedi-
tsii SOPS AN UzSSR, no.1) (MIRA 16:4)

1. Akademiya nauk Uzbekskoy SSR. Tashkent. Otdel geografii.
2. Nachal'nik Otdela sel'skogo khozyaystva Gosplana Uzbek-
skoy SSR (for Degtyar').

(Bukhara Province--Agricultural geography)
(Samarkand Province--Agricultural geography)

SHERNIN, Arkadii Iosifovich.

Kassin, Nikolai Grigor'evich, ed.

The ancient animal world of the Kirov Oblast, Kirov, Kirovskoe obl. izd-vo,
1941. 51 p. maps (Kirovskii oblastnoi nauchno -issledovatel'skii institut kraevedeniia .
Nauchno-populiarnaiia seriia, vyp. 5) (44-10364)

QE755.R935

SIULIS, G. E. AND SHERNIN A. I. (Dotsent) Kirov.

"Effect of Long Phenological series on Secular Climatic Fluctuations:"

report presented at a Phenological Conference, Leningrad, Nov 1957,
by the USSR Geographical Soc.

SHERNIN, A.I., dots.; ZAMARAYEV, V.N., dots., red.; KREYS, I.G., tekhn.red.

[Programs of pedagogical institutes; general biology with principles of Darwinism for faculties of physical education] Programmy pedagogicheskikh institutov; obshchaya biologiya s osnovami darvinizma dlia fakul'tetov fizicheskogo vospitaniia. [Moskva] Uchpedgiz, 1957
9 p. (MIRA 11:3)

1. Russia (1917- R.S.F.S.R.) Glavnoye upravleniye vysshikh i srednikh pedagogicheskikh uchebnykh zavedenii.
(Biology--Study and teaching)

SHCHEKLEIN, S.L., doktor sel'skokhoz.nauk, nauchnyy red.; SHERNIN,
A.I., kand.biolog.nauk; KARDAKOVA, Ye.A., red.; SKLYAROVA,
Ye.I., tekhn.red.

[Nature in Kirov Province] Priroda Kirovskoi oblasti. Kirov.
Kirovskoe knizhnoe izd-vo, 1960. 251 p.

(MIRA 13:12)

(Kirov Province--Geography)

SHERNITSKIY, V. V., TRUFYAKOV, V. I.

Bridges, Iron and Steel

Joining cross and longitudinal girders in all welded bridges with lower roadway. Avtom. svar. 4 No. 4, (19) 1951.

Monthly List of Russian Accessions, Library of Congress, June 1952. Unclassified.

SHEERNOBRIVETS, V.Ie.

Models received by the Russian fleet. Sudostroyenie no.7:79-80
21 '65. (MIRA 16:8)

SHERNYAKIN, F.M.

Some uses of chromatography in qualitative and quantitative analysis of cations. F.M. Shernyakin (Pharm. Inst. Minister Health U.S.S.R., Moscow). Trudy Komiteta Anal. Khim. Akad. Nauk S.S.S.R., Izd. Geokhimi. i Anal. Khim. 6, 268-56(1965); cf. C.A. 49, 3505g. — A survey with 23 references. Barilla Mayette

AM
2/24

17(

SOV/177-58-5-10/30

AUTHOR: Shernyakov, M.A., Lieutenant-Colonel of the Medical Corps

TITLE: The Effect of Systematic Morning Exercises on the Physical Development of Elderly Officers (Vliyaniye sistematicheskikh utrennykh uprazhneniy na fizicheskoye razvitiye ofitserov starshego vosrasta)

PERIODICAL: Voenno-meditsinskiy zhurnal, 1958, Nr 5, pp 48 - 51 (USSR)

ABSTRACT: The author deals with characteristics of the level and the dynamics of the physical development of elderly officers in connection with physical exercises in the morning. The article is based on examinations of 393 officers over 42 years of age during the years 1953/54. The author concluded that officers who systematically perform physical exercises in the morning are much better physically developed than

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SOV/177-58-5-10/30

The Effect of Systematic Morning Exercises on the Physical Development of Elderly Officers

officers who do not occupy themselves with exercises. He suggests to work out a special plan for physical exercises for elderly officers in order to raise the level of their physical development. There are 3 tables.

Card 2/2

SHERNYAKOV, M.A.

Combined study on the state of health and physical development
of officers. Voen.-med.zhur. no. 2:63-64 F '61. (MIRA 14:2)
(MEDICINE, MILITARY)

SHERNYAKOV, M. A.

"Experience of developing tables for the individual evaluation of the physical development of officers" - p. 68

Voyenno Meditsinskiy Zhurnal, No. 3, 1962

SHEROBOKOV, M. Ya

1300. Light scattering on a particle with a spin two. M. Ia. Sherobokov. Zhur. Ekspit. i Teoret. Fiz. 19, 473-80(1949) June (in Russian).

It is known that the effective cross section of certain particles for light scattering, even when calculated in the first non-vanishing approximation of the perturbation theory, grown indefinitely with the frequency of light. In order to account for this difficulty, Ginsburg, Zhur. Ekspit. i Teoret. Fiz. 13, 33(1943) and Heitler, et al, Proc. Roy. Soc. (London) A, 176, 368(1940), suggested the idea of excited spin states. Relativistic equations were found for particles with higher spins. However, no close investigation of the properties of such particles was made. In this respect only the work of Ginsburg, Zhur. Ekspit. i Teoret. Fiz. 12, 425(1942), may be cited, in which magnetic properties of a particle with a $3/2$ spin are studied. The interest of such studies lies not only in the possibility of several variants of the theory, but also in the possible practical use of the equations for such particles; thus, the spin of mesons cannot be regarded as definitely established. The present work is an investigation of the scattering of light on particles with a spin two

ASB-3LA METALLURGICAL LITERATURE CLASSIFICATION

that are described by wave equations found by Fierz and Pauli, Helv. Phys. Acta 12, 3(1939); Proc. Roy. Soc. (London) A, 172, 211(1939). The rapid growth with increasing photon energy of the effective cross section for light scattering of a particle having a spin two can be explained by attributing to such a particle a kinetic moment of an order higher than that of a dipole.

SHERNYKH, G.A.

Effect of hydrogen sulfide and radon baths on the blood coagulability
in hypertension and atherosclerosis. Vop. kur., fizioter. i lech. fiz.
kul't. 29 no.4:312-316 J1-Ag '64. (MIRA 18:9)

1. Terapevticheskaya klinika (zav. - prof. N.I.Speranskiy) Tsentral'nogo
instituta kurortologii i fizioterapii (dir. - kand. med. nauk G.N.Pospelova), Moskva.

S/0181/64/006/003/0722/0727

ACCESSION NR: AP4019829

AUTHORS: Kagan, M. S.; Lifshits, T. M.; Musatov, A. L.; Sheronov, A. A.

TITLE: Autoelectronic emission from high resistance germanium

SOURCE: Fizika tverdogo tela, v. 6, no. 3, 1964, 722-727

TOPIC TAGS: secondary emission, semiconductor property, EMU 3 electromagnetic amplifier, volt ampere characteristic, semiconductor resistance

ABSTRACT: Studies were made on both n- and p-type germanium at temperatures of 293 and 80K. The germanium was doped with gold and compensated with antimony. The gold concentration was $5 \cdot 10^{14} \text{ cm}^{-3}$ and the antimony concentration was of the same order, but chosen in such a way that the sample had high resistance at the temperature of liquid nitrogen. Resistivities attained for n-type germanium at 80K were about 10^8 ohm cm , and for p-type 10^6 ohm cm . The volt-ampere characteristics of emission and the distribution of electrons according to energy are shown in Figs. 1 and 2 on the Enclosures. They exhibit no perceptible effect of "heating".

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ACCESSION NR: AP4019829

up" the electrons in the emitter. A high density of autoemission current is connected with high electron concentration at the point, exceeding the body concentration in the massive part of the emitter by a factor of thousands. The authors found that when the sample was coated with cesium the work function of the point was reduced much more than the work function of the side of the sample, apparently because of different conditions of cesium absorption, possibly because of temperature differences at the point and in the massive part of the sample. It is noted that when the electron affinity is reduced to 1.6 ev the volt-ampere characteristics are strictly linear, and this fact should attest to the effect of heating of electrons during autoelectron emission from germanium. Orig. art. has: 6 figures and 1 table.

ASSOCIATION: Institut radiotekhniki i elektroniki AN SSSR, Moscow (Institute of Radio Engineering and Electronics AN SSSR)

SUBMITTED: 03Aug63

DATE ACQ: 31Mar64

ENCL: 02

SUB CODE: EG, NP

NO REF SOV: 009

OTHER: 002

Card 2/4

ACCESSION NR: AP4019829

ENCLOSURE: 01

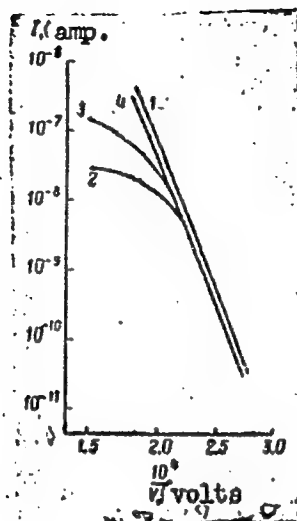


Fig. 1. Volt-ampere characteristics of autoelectron emission from germanium.

Temperature: 1 - 293K; 2-4 - 80K;
1,2 - nonirradiated samples;
3 - weakly irradiated sample;
4 - strongly irradiated sample.

Card 3/4

ACCESSION NR: AP4019829

ENCLOSURE: 02

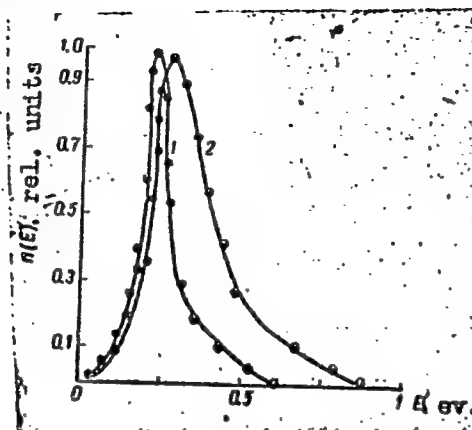


Fig. 2. Energy spectrum of emitted electrons

I: 1 - $2 \cdot 10^{-9}$ amps; 2 - $7 \cdot 10^{-9}$ amps.

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L 4964-66 EWA(k)/EBD/ENT(1)/EWT(m)/EEC(k)-2/T/ENP(t)/ENP(k)/ENP(b)/EWA(m)-2/EWA(h)
 ACC NR: AP5027449 SOURCE CODE: UR/0181/65/007/011/3460/3461
 SCTB/IJP(c) WG/JD/JG 44
 AUTHOR: Basov, N. G.; Zakharov, Yu. P.; Nikitin, V. V.; Sheronov, A. A. 44

ORG: Physics Institute im. P. N. Lebedev, AN SSSR, Moscow (Fizicheskiy institut AN SSSR) 44 54 B

TITLE: Interaction between optically coupled GaAs diode lasers

SOURCE: Fizika tverdogo tela, v. 7, no. 11, 1965, 3460-3461

TOPIC TAGS: solid state laser, gallium arsenide laser, laser coupling, laser synchronization, laser beam, beam quenching

ABSTRACT: Two systems of optical coupling between p-n GaAs diode lasers—"longitudinal," in which laser beams coincide, and "transverse," in which they are perpendicular to each other—were investigated. In both cases, the diodes were prepared in the form of Fabry-Perot resonators and set up on the same substrate from 5 to 100 μ apart. The effectiveness of beam quenching for the transversely coupled lasers was 1%. The wavelength of the quenching laser emission was greater than that of the quenched and the beam entered the quenched laser laterally. Beam quenching in the longitudinally coupled system was observed only when the wavelength of the quenching emission was greater than that of the quenched. Similar effects were observed elsewhere.

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ACC NR: AP5027449

(A. Fowler, J. Appl. Phys., 35, 2275, 1964; J. Appl. Phys. Lett., 3, 1, 1963). The low effectiveness of quenching in both cases was attributed to the difficulties experienced in accurately setting up both diodes on the same substrate. Improved (~20%) beam quenching was achieved by means of special diodes, each with two resonators, described elsewhere by the authors (PTT, 7, 3128, 1965). The quenching effect is potentially applicable in computer technology (high-speed optical keying).
Orig. art. has: 1 figure. [YK]

SUB CODE: EC/ SUBM DATE: 15Jun65/ ORIG REF: 001/ OTH REF: 003

ATD PRESS: 4131

Card

2/2

L 3977-66 EWA(k)/FBD/ENT(1)/EEC(k)-2/I/ENP(k)/EWA(m)-2/EWA(h) SCTB/IJP(c) WG
 UR/0181/65/007/010/3128/2130
 ACCESSION NR: AP5025404

AUTHOR: Basov, N. G.⁴⁴; Zakharov, Yu. P.⁴⁴; Nikitin, V. V.⁴⁴; Sheronov, A. A.⁴⁴

TITLE: GaAs junction laser with a nonuniform distribution of injected current

SOURCE: Fizika tverdogo tela, v. 7, no. 10, 1965, 3128-3130

TOPIC TAGS: laser, junction laser, injection laser, semiconductor laser, GaAs, p n junction, injection current, coherent radiation, recombination radiation

ABSTRACT: The effect of an uneven distribution of the injection current along the p-n junction area of a GaAs laser diode on its emission was experimentally investigated. Diodes with a 2-mm overall cavity length and a 0.4-mm width were used in the experiments. The p-side of a standard laser with polished ends was cut perpendicular to diode's length down to the junction area (see Fig. 1 of Enclosure), resulting in two electrically separated cavity sections with a contact attached to each part. The coupling resistance between the diodes was large in comparison with the resistance of the contacts and the bulk resistance. The diode, cooled to the liquid nitrogen temperature, was excited by current pulses of 1-μsec duration. The lowest threshold current was required when injection current densities in both sections of the diodes were equal. The wavelength of coherent emission at the threshold current was larger

Card 1/3

L 3977-66

ACCESSION NR: AP5025404

by about 20 Å than the wavelength of emission during uneven excitation regime, i.e., when current $I_1 = I_2$. When I_2 was constant while I_1 was increased from 0 to 1 amp, the frequency of laser emission at $\lambda \sim 8430$ Å was gradually shifted toward higher frequencies by 50 cps. When I_1 was further increased, generation was achieved at $\lambda \sim 8450$ Å while coherent emission at $\lambda \sim 8430$ Å decreased and finally disappeared. At the same time the maximum of the line (half width ~ 30 Å) was shifted by ~ 2 Å toward the longer wavelengths. A similar quenching effect at ~ 8430 Å was observed in the direction perpendicular to the axis of the diode. It was determined that when the injection current was sufficiently large in one section of the laser a large increase in power output was obtained by simultaneously injecting current through both contacts on the p-side of the diode. Since the slope of the power-current curve of the dual diode structure increased approximately two times in comparison with that of a single section diode, the use of the dual structure for modulation may be more useful than that of a standard injection laser. Orig. art. has: 1 figure. [CS]

ASSOCIATION: Fizicheskiy institut im. P. N. Lebedeva AN SSSR, Moscow (Physics Institute, AN SSSR)

SUBMITTED: 17May65
NO REF SOV: 001

ENCL: 01
OTHER: 002

SUB CODE: EC, OP
ATD PRESS: 4118

Card 2/3

L 3977-66

ACCESSION NR: AP5025404

ENCLOSURE: 01

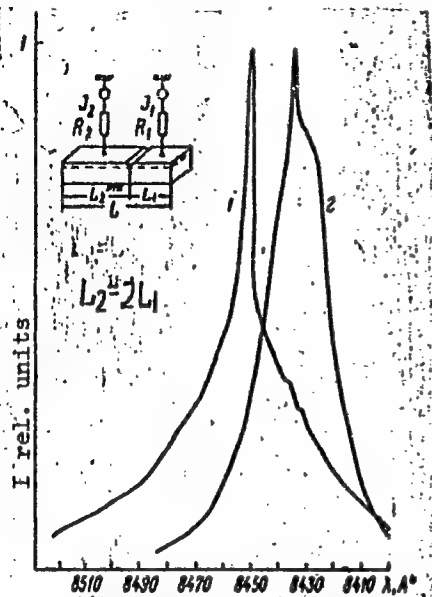


Fig. 1. Emission spectra near the threshold

1 - Current densities in both parts of the dual diode structure are equal, $I = 19$ amp; 2 - current densities in the two parts are not equal, $I_1 = 0$, $I_2 = 34$ amp.

Card 3/3

SOV/78-3-11-4/23

AUTHORS: Ptitsyn, B. V., Sheronov, L. N., Komlev, V. P.

TITLE: The Determination of the Solubility Products of Silver Citrate at Different Ionic Strength of the Solution (Opredeleniye proizvedeniya rastvorimosti tsitrata serebra pri raznoy ionnoy sile rastvora)

PERIODICAL: Zhurnal neorganicheskoy khimii, 1958, Vol 3, Nr 11, pp 2450-2452 (USSR)

ABSTRACT: In the present paper the optimum conditions for the production of silver citrate of the composition $Ag_3C_6H_5O_7$ were investigated, and the solubility products of silver citrate were determined by means of the radioactive indicator Ag^{110} . The solubility product of silver citrate was determined as function of the ionic strength of the solution at 25°C. Sodium citrate solution was added to a silver nitrate solution in order to produce silver citrate. This sequence of addition of reagents leads to crystalline silver citrate which precipitates easily. In the case of an inverse addition of silver nitrate to sodium citrate a fine dispersion is produced which can be scarcely filtered.

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SOV/78-3-11-4/23

The Determination of the Solubility Products of Silver Citrate at Different Ionic Strength of the Solution

The thermodynamic value of the solubility product of silver citrate was determined for solutions with an ionic strength of 0,002 - 0,103. In the case of an ionic strength of 0,002 of the solution the solubility of $\text{Ag}_3\text{C}_6\text{H}_5\text{O}_7$ amounts to $3,4 \cdot 10^{-4} \text{ g-mol/l}$ and the solubility product $k^0 = (3,3 \pm 0,1) \cdot 10^{-13}$. In the case of an ionic strength of 0,103 of the solution the solubility amounts to $5,5 \cdot 10^{-4} \text{ g-mol/l}$ and $k^0 = (2,4 \pm 0,3) \cdot 10^{-12}$. These results show that the solubility product changes by almost the tenfold with the change of the ionic strength of the solution of 0,002 - 0,103. Figure 1 shows the dependence of the negative logarithm of the solubility products of silver citrate (pK) on the ionic strength of the solution. There are 1 figure, 2 tables, and 4 references, 1 of which is Soviet.

SUBMITTED: April 10, 1957

Card 2/2

SOV/78-4-2-20/40

5(2)

AUTHORS: Sheronov, L. N., Ptitsyn, B. V.

TITLE: On a Citrate Complex of Zirconium (O kompleksnom tsitrate tsirkoniya)

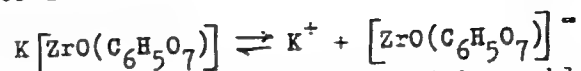
PERIODICAL: Zhurnal neorganicheskoy khimii, 1959, Vol 4, Nr 2, pp 367-371 (USSR)

ABSTRACT: Upon the interaction of 1 mole zirconium carbonate with 1.5 moles citric acid, which is semi-saturated with KOH, a complex potassium zirconyl citrate of the composition $K[ZrO(C_6H_5O_7)] \cdot 2.5H_2O$ is formed. The complex $K_3C_6H_5O_7 \cdot ZrC_6H_4O_7 \cdot 9.5H_2O$ described by Mandl (Ref 1) is not formed under these production conditions. In order to determine the coordination formula of the compound obtained the molecular electric conductivity and the molecular weight of this compound were determined. The molecular weight of potassium zirconyl citrate in aqueous solution shows values from 175-195. The molecular weight and the molecular electric conductivity show that, in aqueous solution, the compound dissociates into two ions:

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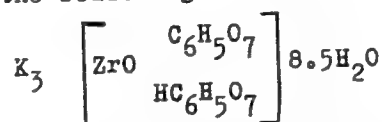
SOV/78-4-2-20/40

On a Citrate Complex of Zirconium



The aqueous solution of the compound is weakly acid. For the potassium zirconyl citrate complex produced by Mandl the following formula was suggested: $K[ZrO(C_6H_5O_7)] \cdot K_2HC_6H_5O_7 \cdot 8.5H_2O$

and the following coordination formula:



There are 2 tables and 6 references, 2 of which are Soviet.

SUBMITTED: December 12, 1957

Card 2/2

PTITSYN, D.V.; SHERONOV, L.N.

Complex niobium oxalate. Izv. Sib. otd. AN SSSR no.9:44-46 '61.
(MIRA 14:10)

1. Institut neorganicheskoy khimii Sibirskogo otdeleniya
AN SSSR, Novosibirsk.
(Niobium compounds)

PTITSYN, B.V.; SHERONOV, L.N.

Complex zirconium oxalate. Izv. Sib. otd. AN SSSR no.10:80-
83 '61. (MIRA 14:12)

1. Institut neorganicheskoy khimii Sibirskogo otdeleniya
AN SSSR, Novosibirsk.
(Zirconium oxalates)

PTITSYN, B.V. [deceased]; SHERONOV, L.N.

Certain number of niobium complex compounds of relative stability.

Izv. SO AN SSSR no.3: Ser. khim. nauk no.1:68-71 '65.

(MIRA 18:8)

1. Institut neorganicheskoy khimii Sibirskogo otdeleniya AN
SSSR, Novosibirsk.

SHERONOV, V.A., inzh.

110/35/6-10 kv. substations equipped with 31.5 and 40 Mv.-a.
transformers without reactors. Elek.sta. 29 no.11:49-51
N '58. (MIRA 11:12)

(Electric substations)